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Serial No.: 10/696,889      Filed: 10/30/03  
Examiner:                      Group Art Unit: 2812  
Applicant: Mark A. Burns *et al.*  
Title:      **Thermal Micro-Valves for Micro-Integrated Devices**  
Atty. Docket No.: UM-08280      Sheet 1 of 31

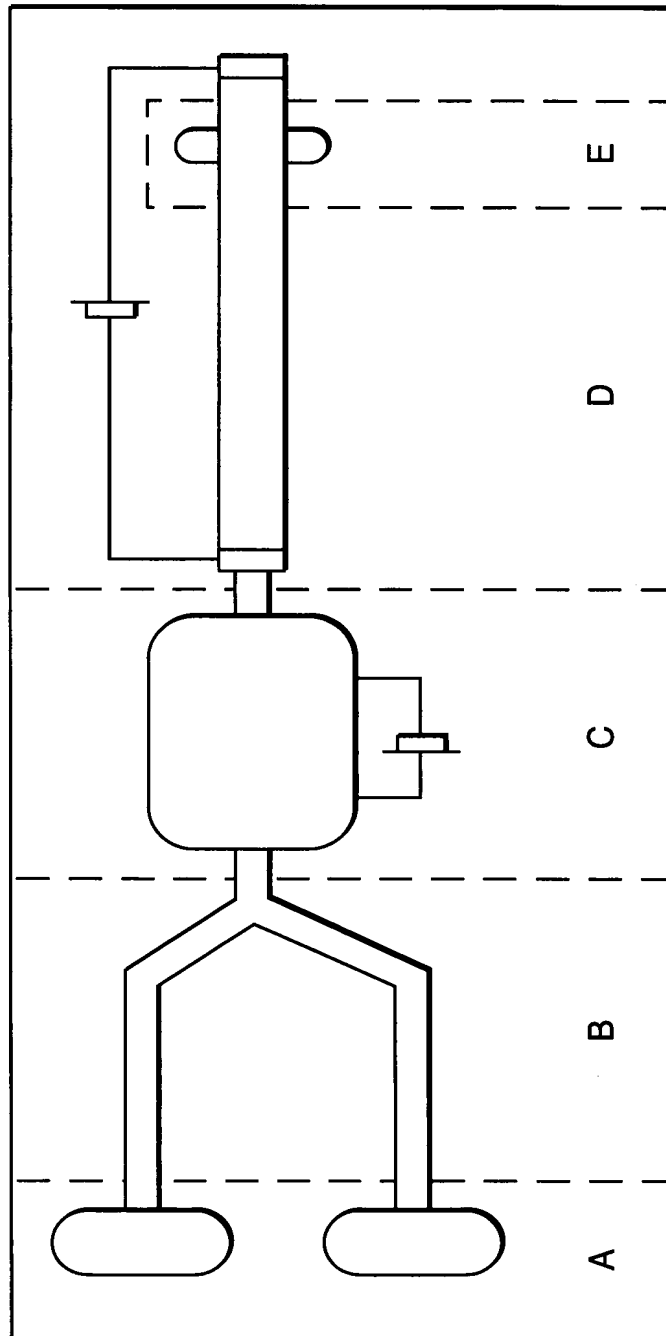
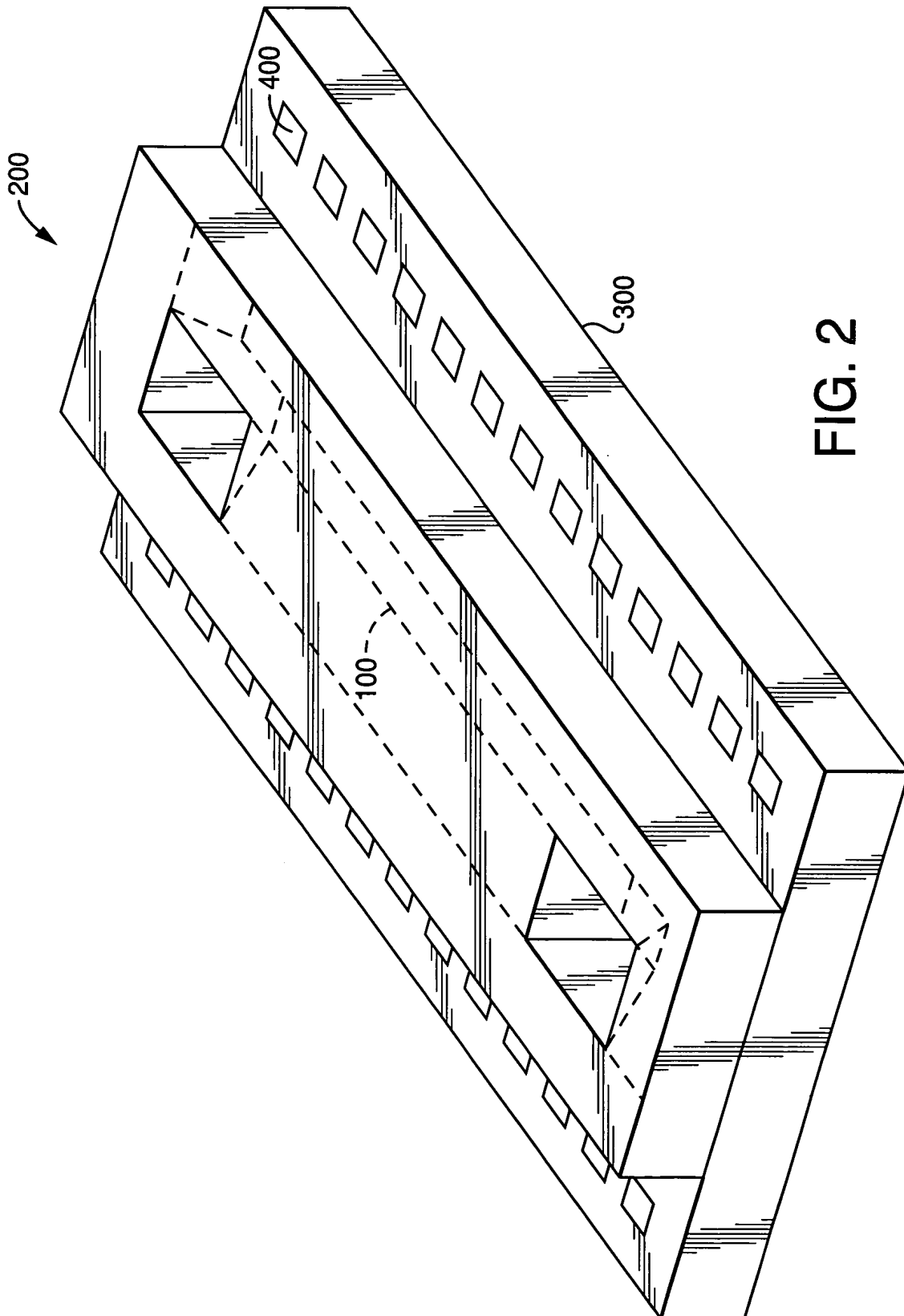


FIG. 1



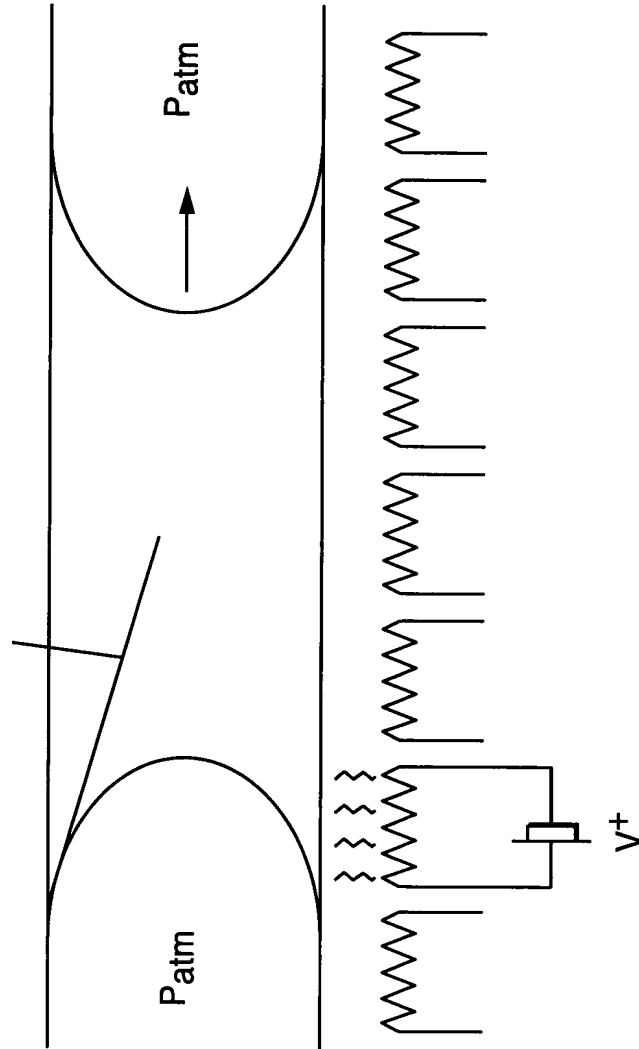


FIG. 3

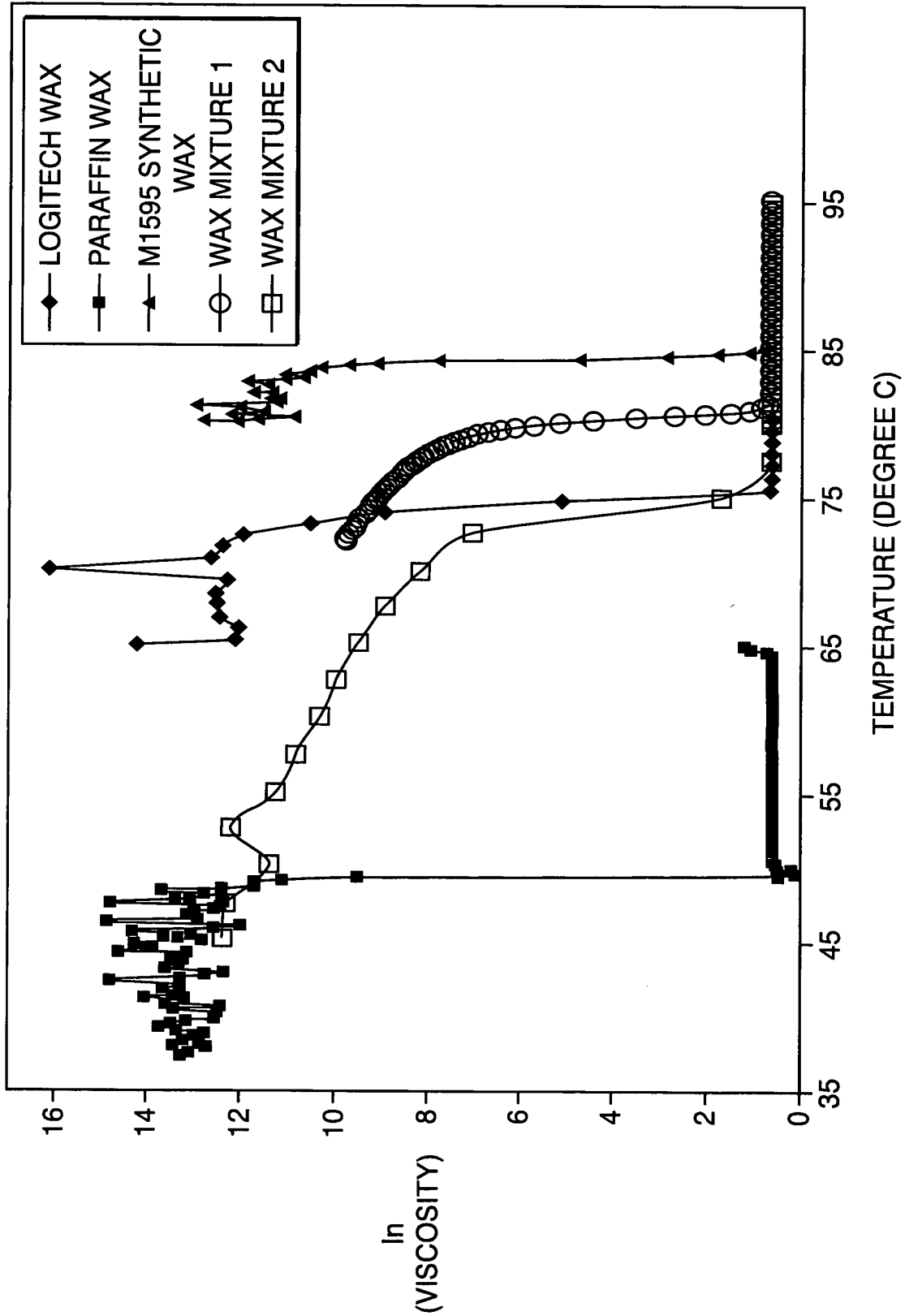


FIG. 4

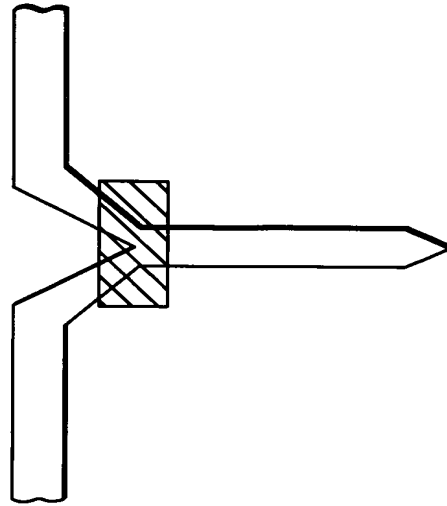


FIG. 5C

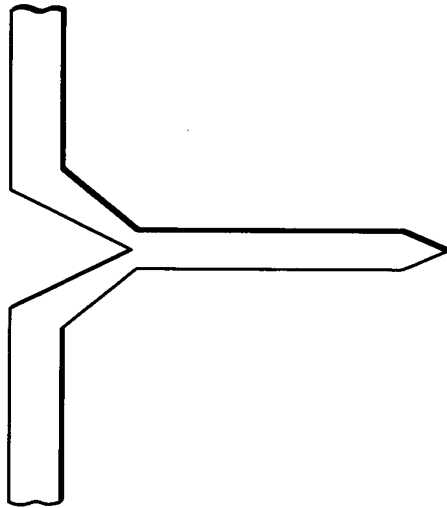


FIG. 5B

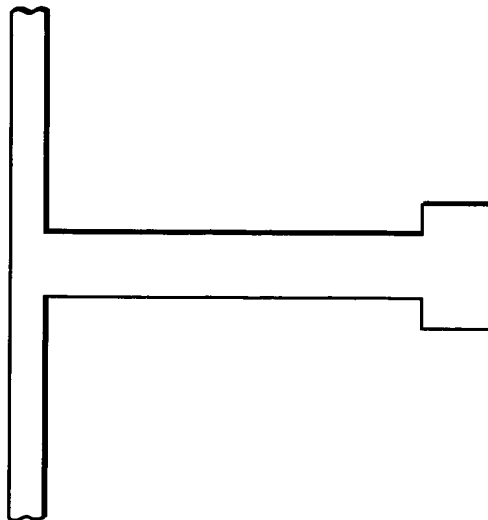


FIG. 5A

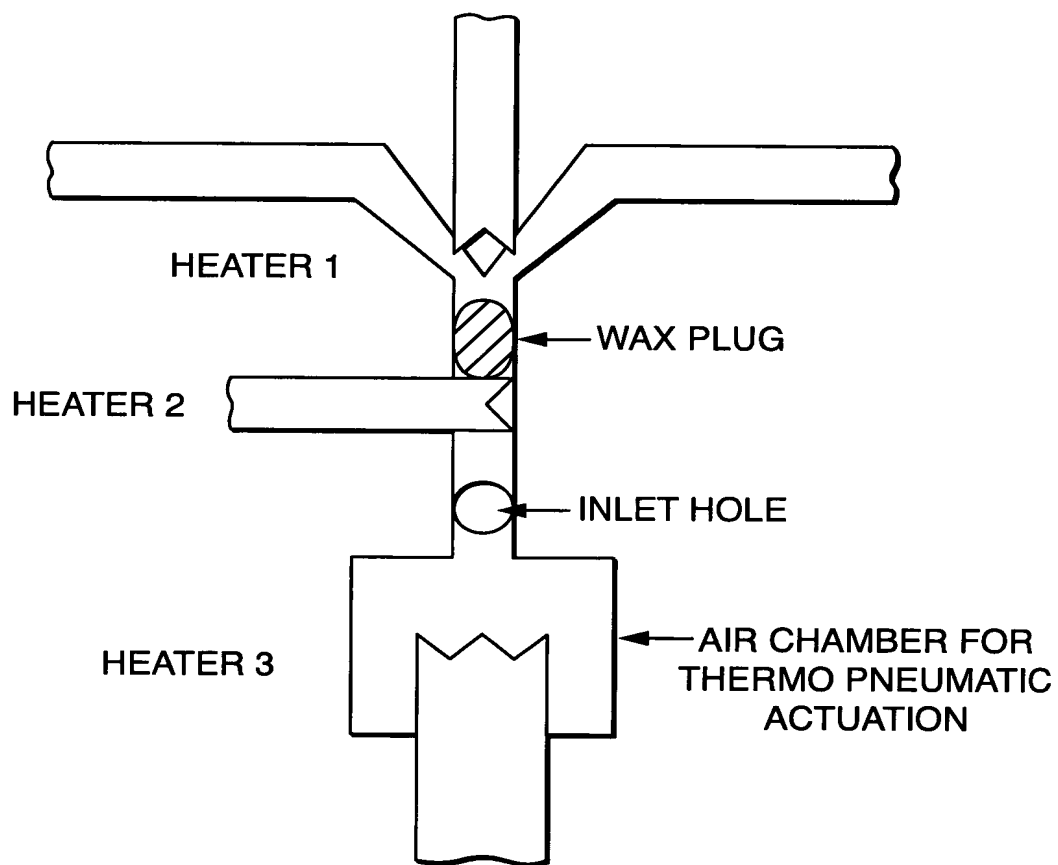
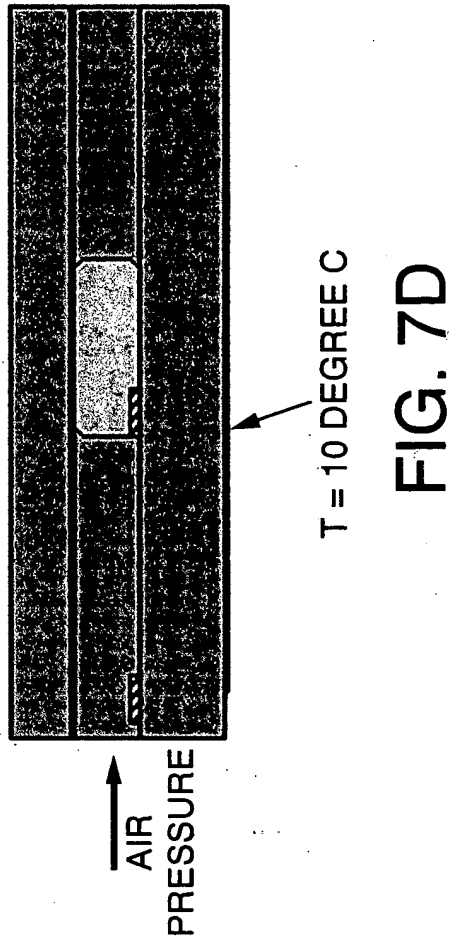
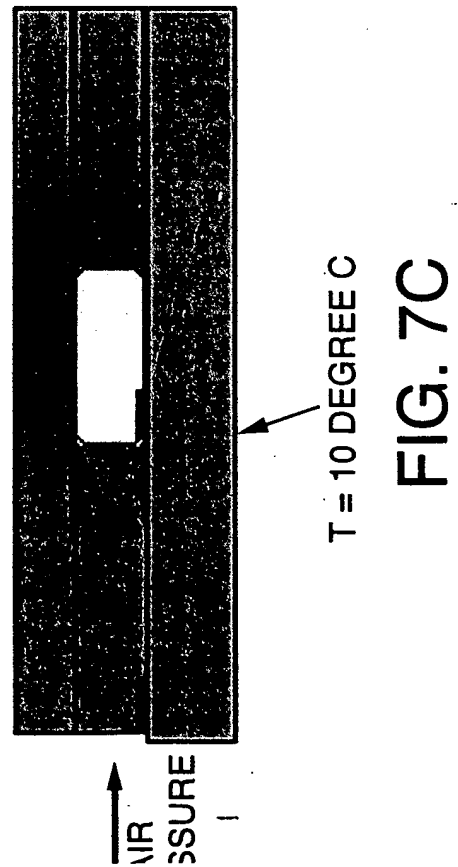
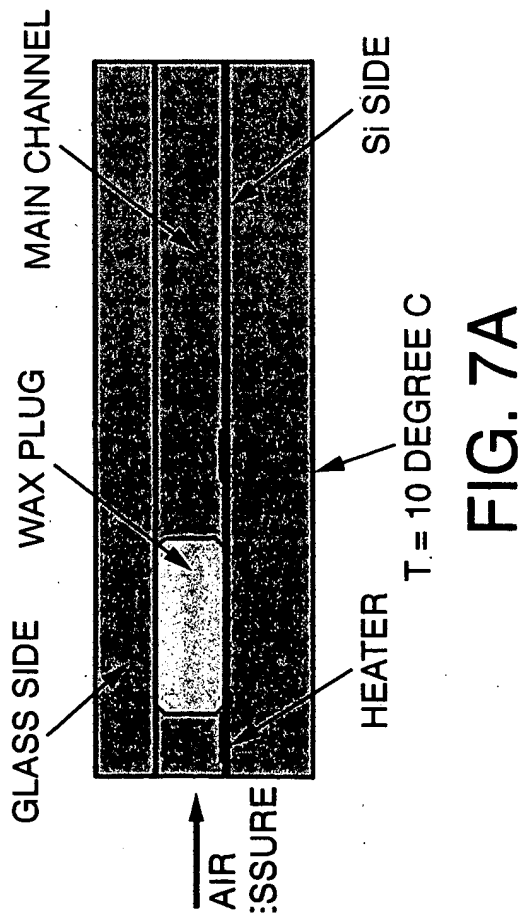


FIG. 6





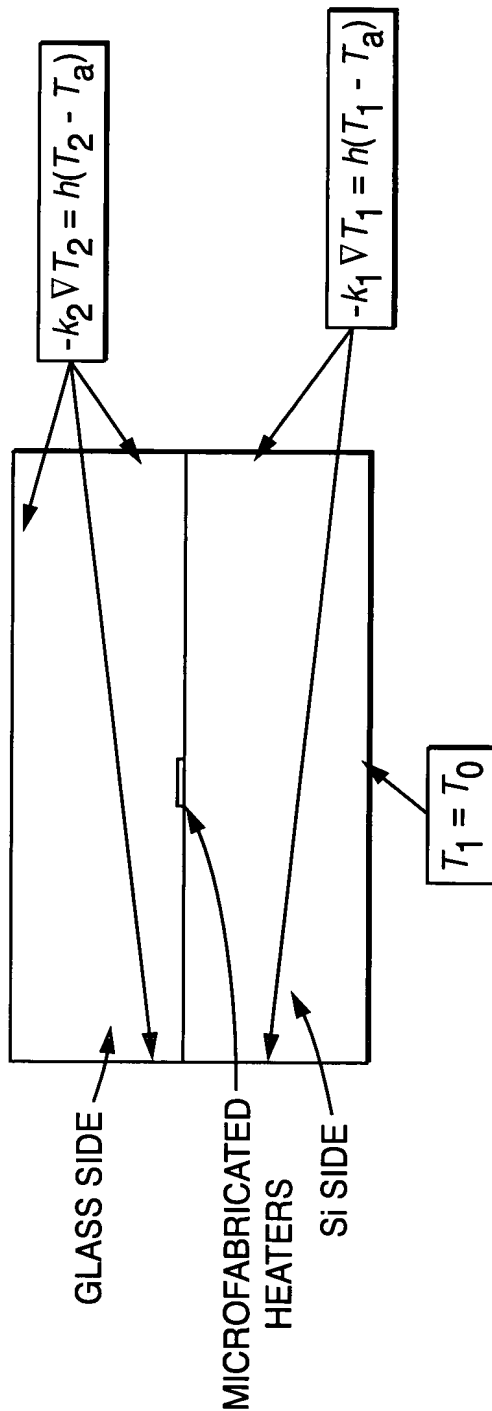


FIG. 8

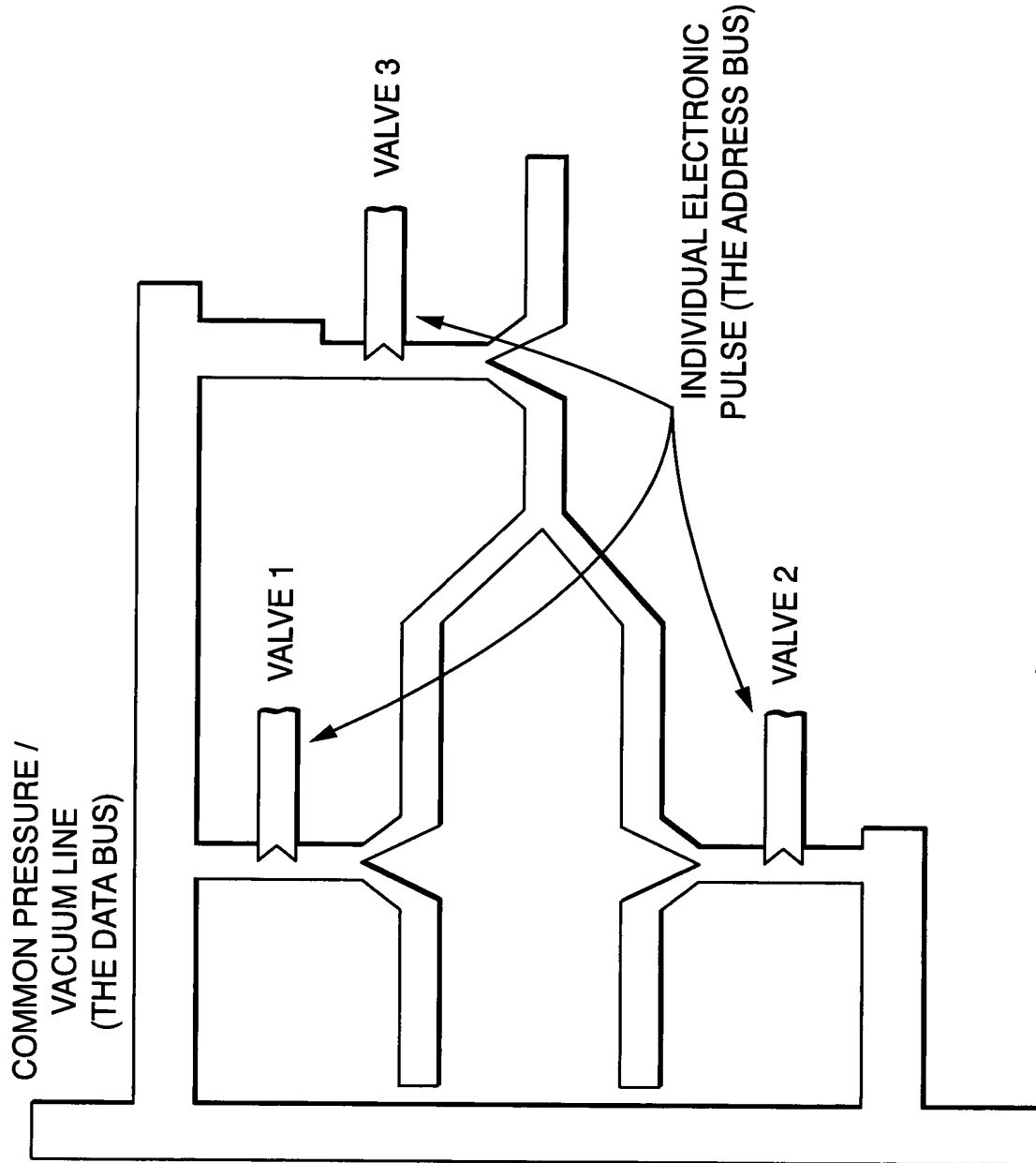


FIG. 9

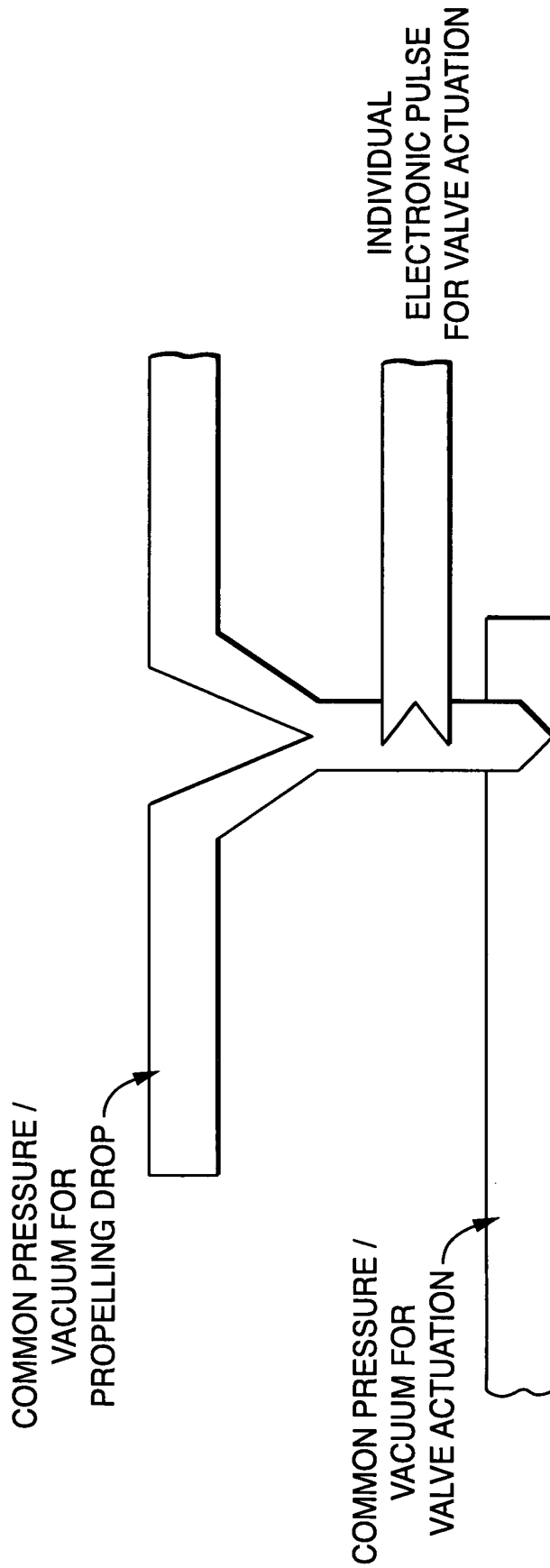


FIG. 10

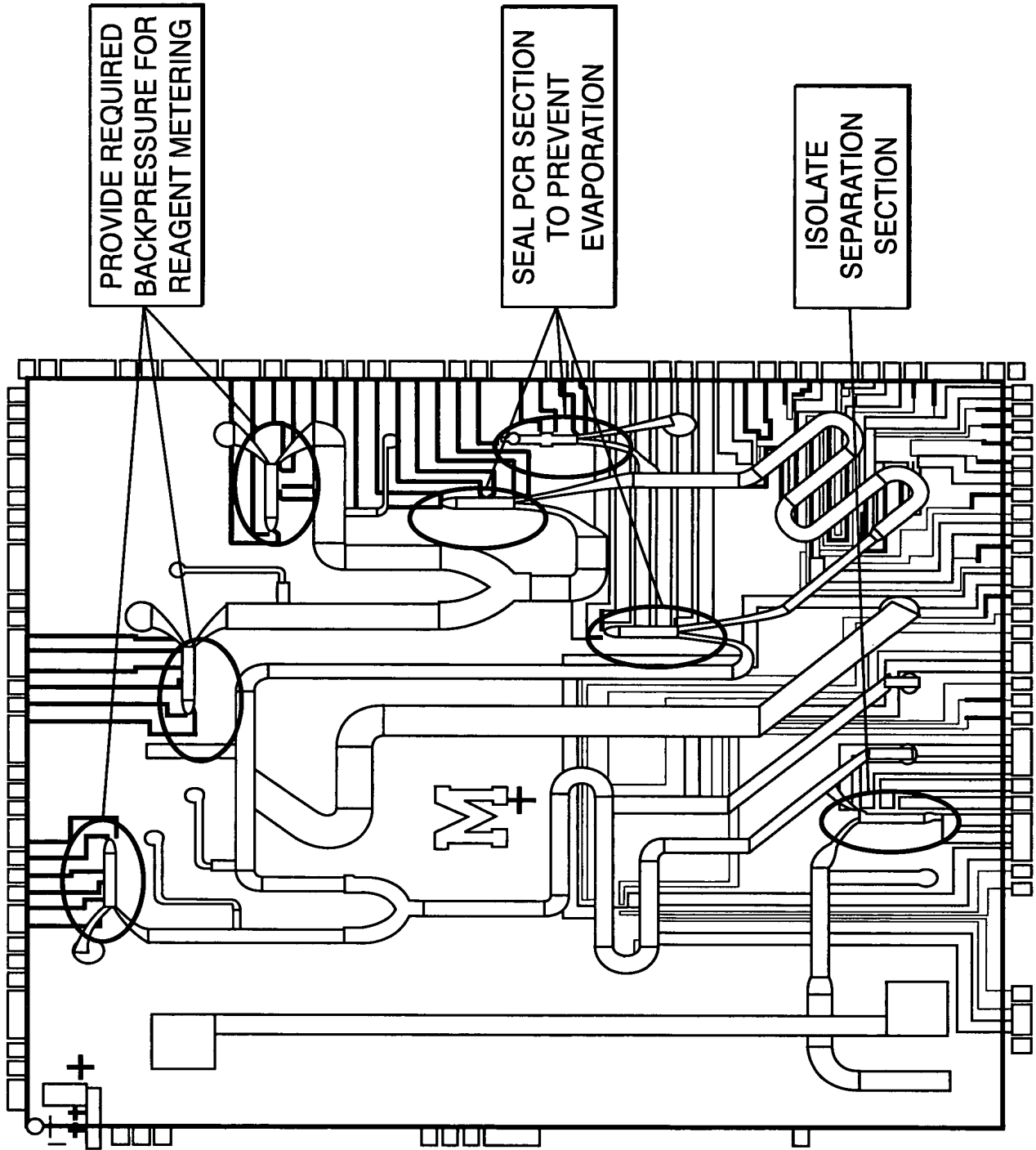


FIG. 11

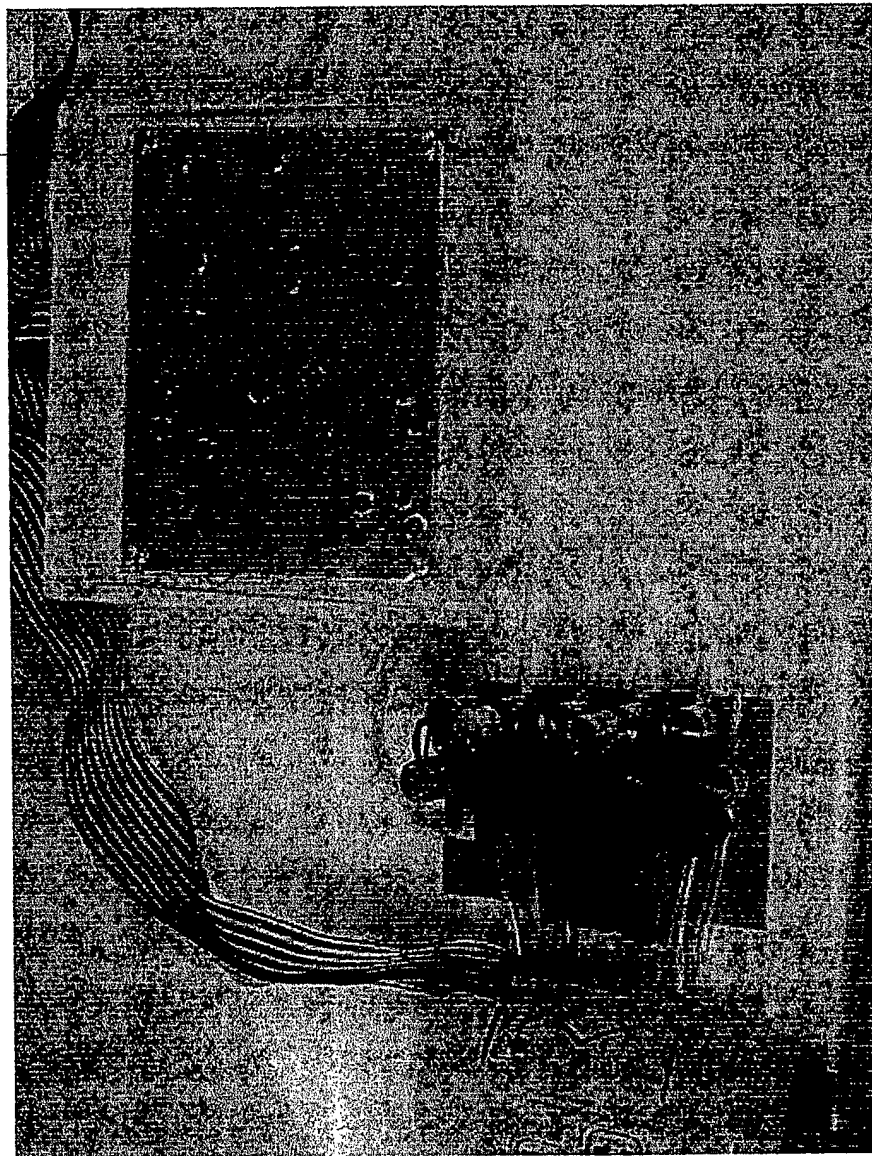


FIG. 12

FIG. 13A

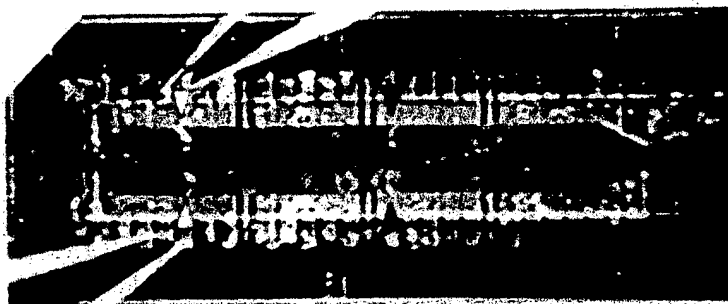


FIG. 13B

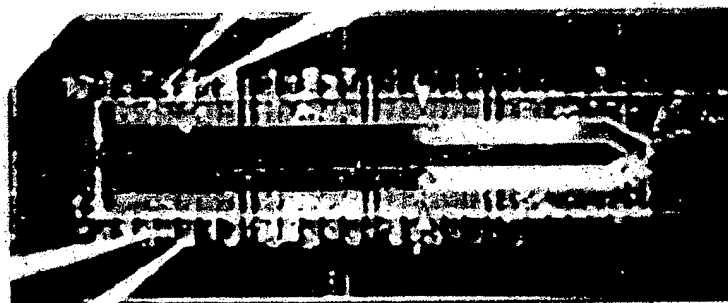


FIG. 13C

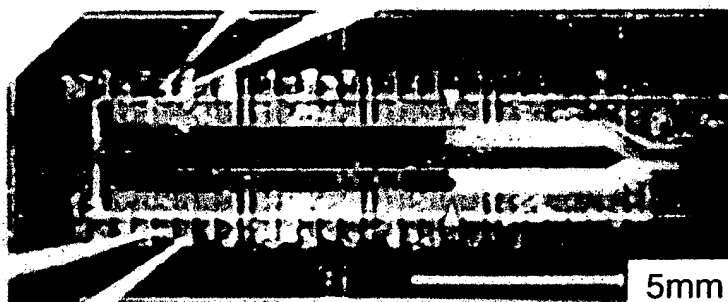
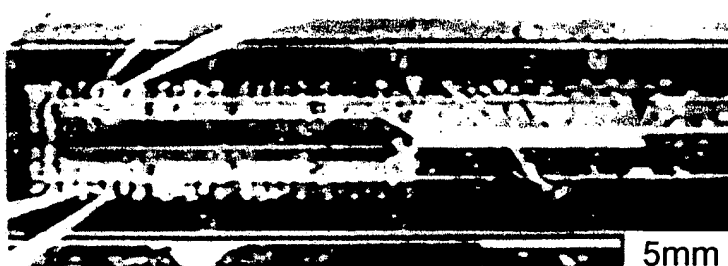


FIG. 13D



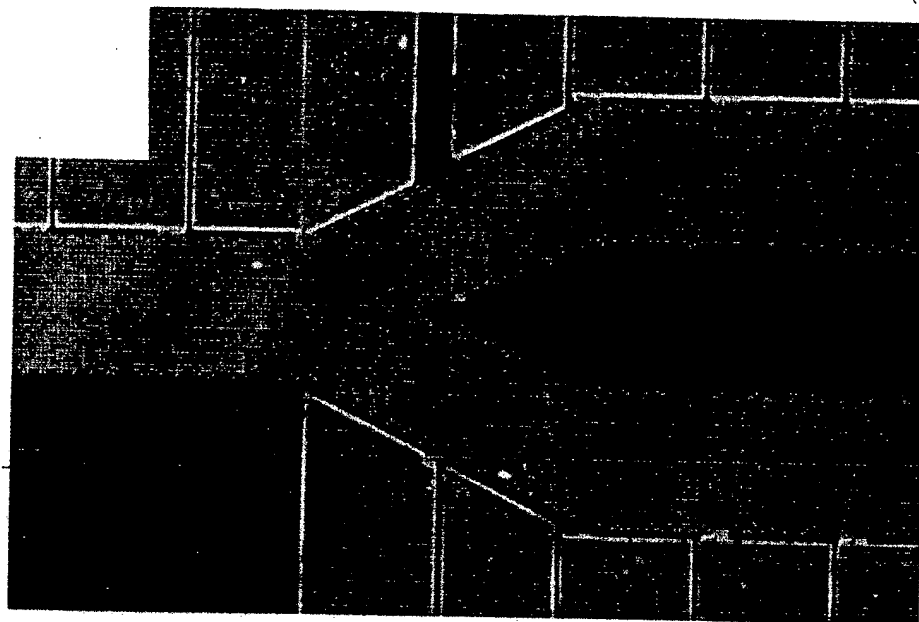
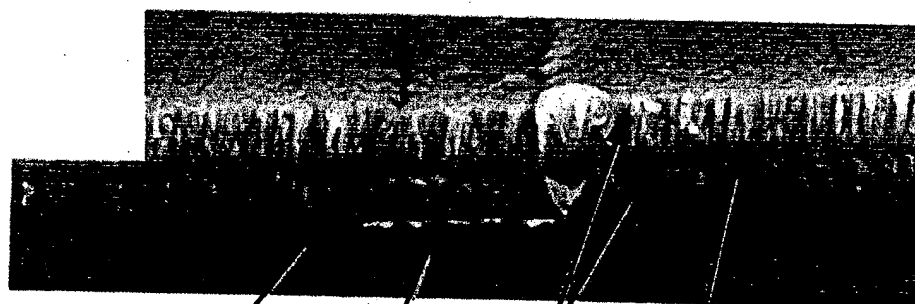


FIG. 14A



$\text{SiO}_2$

$\text{Al}$

$\text{SiO}_x$

$\text{Si}_3\text{N}_4$

FIG. 14B

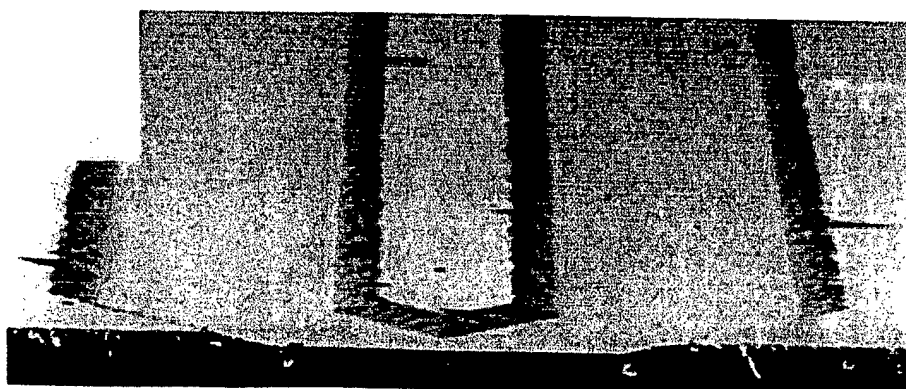


FIG. 15A

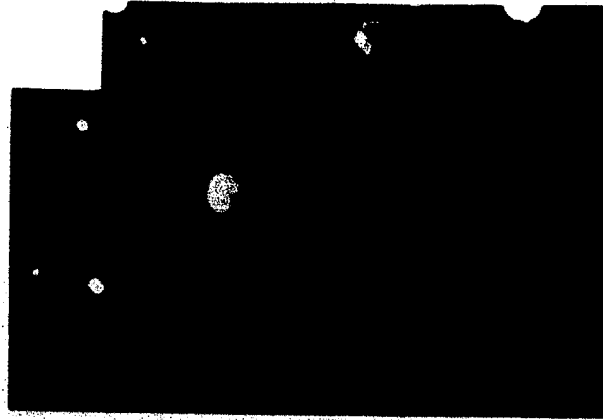


FIG. 15B

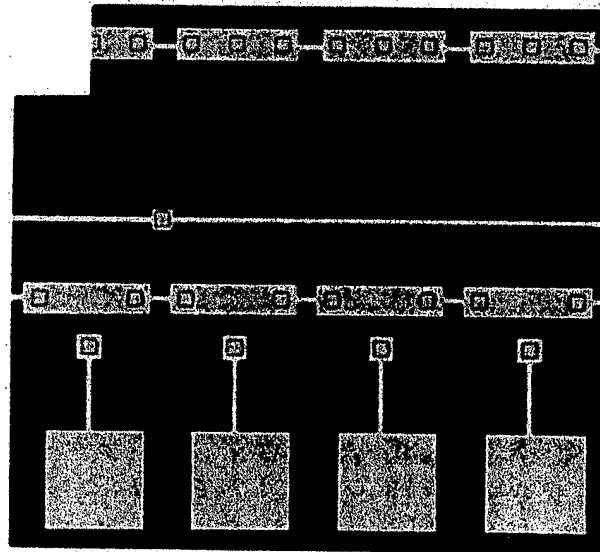
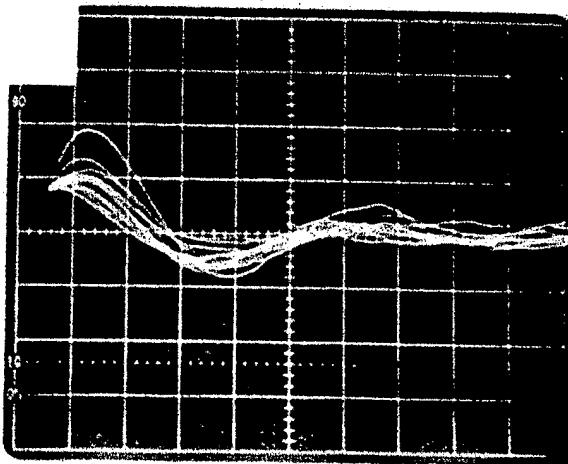


FIG. 15C





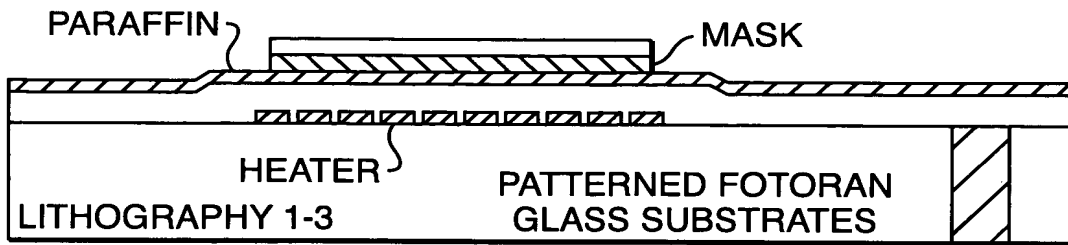


FIG. 16A

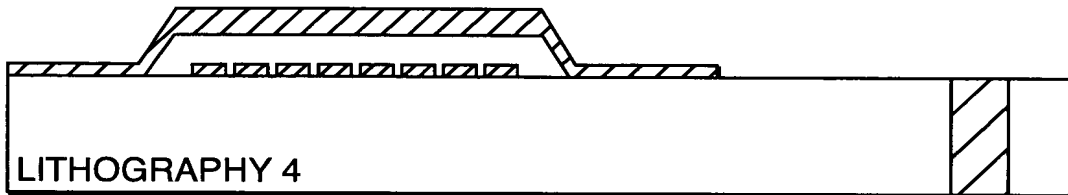


FIG. 16B

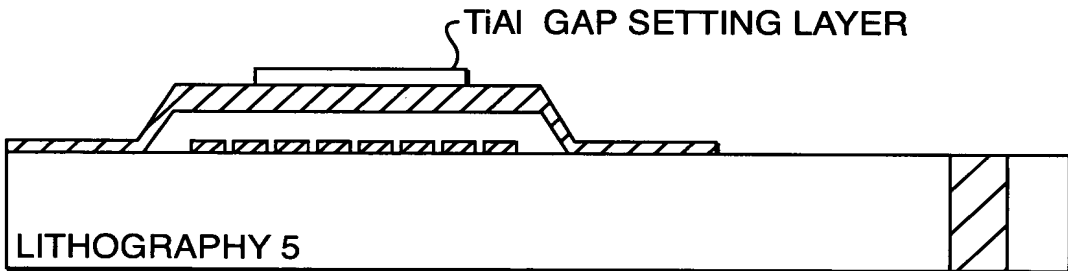


FIG. 16C

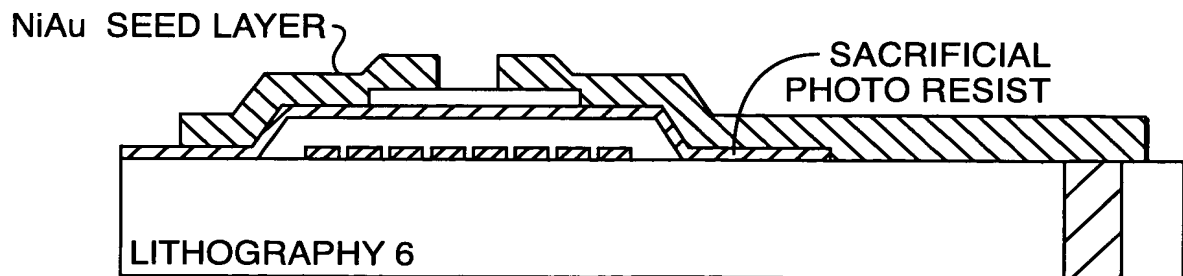


FIG. 16D

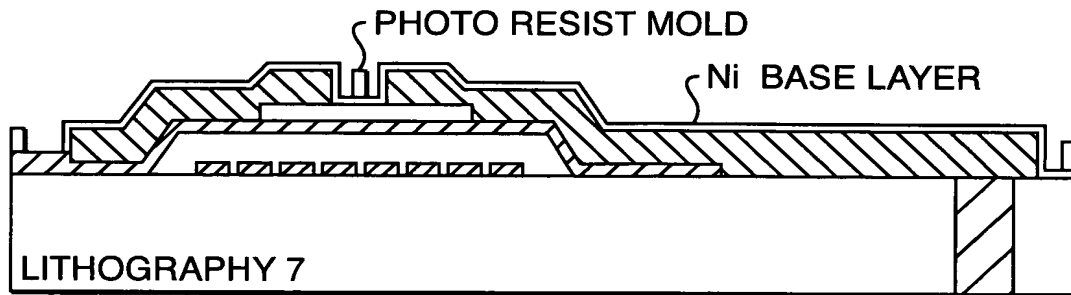


FIG. 16E

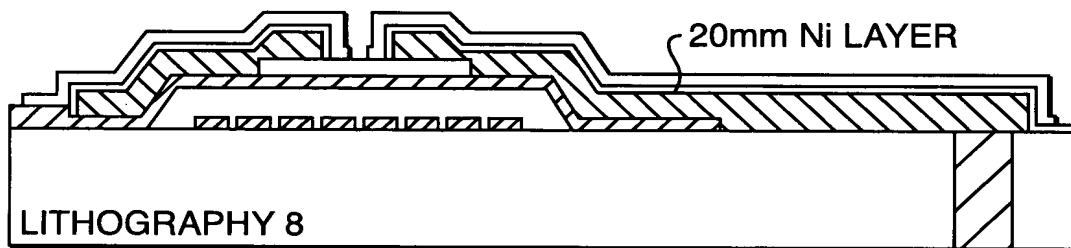


FIG. 16F

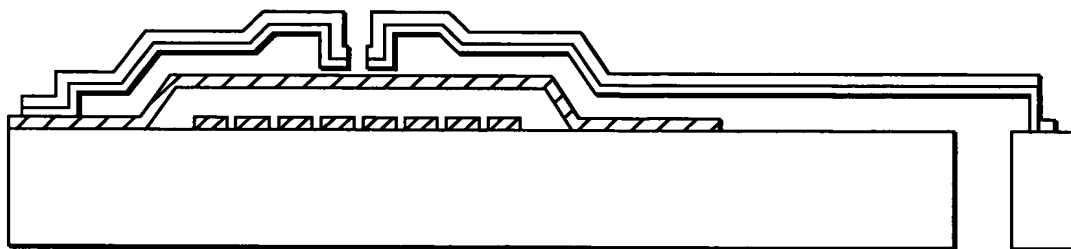


FIG. 16G

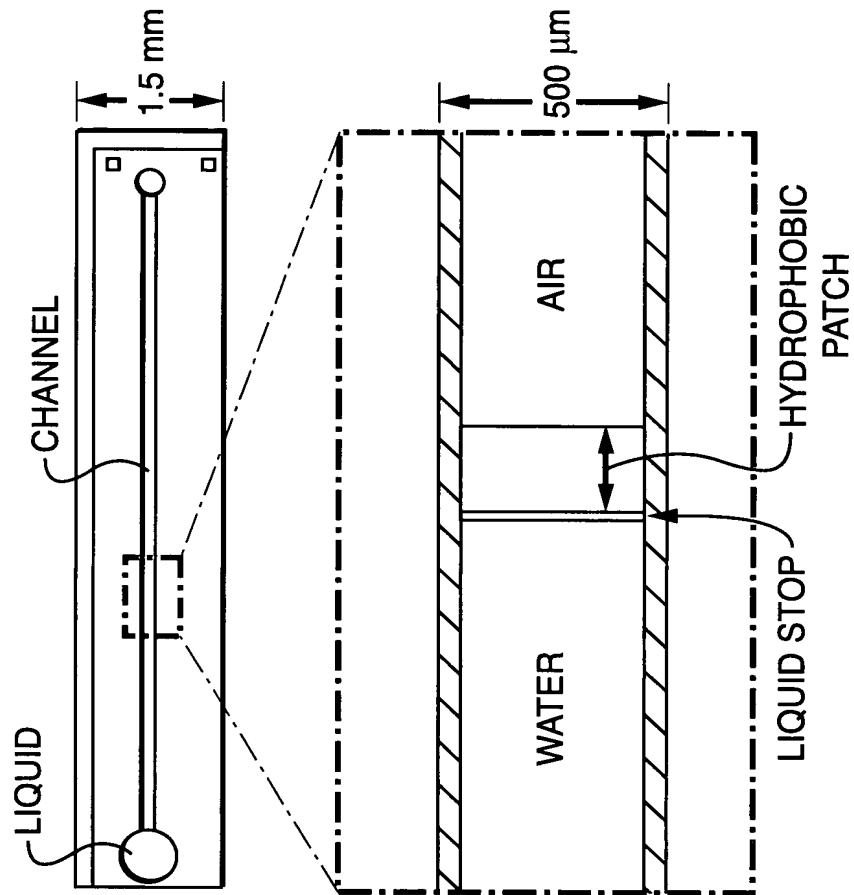


FIG. 17A

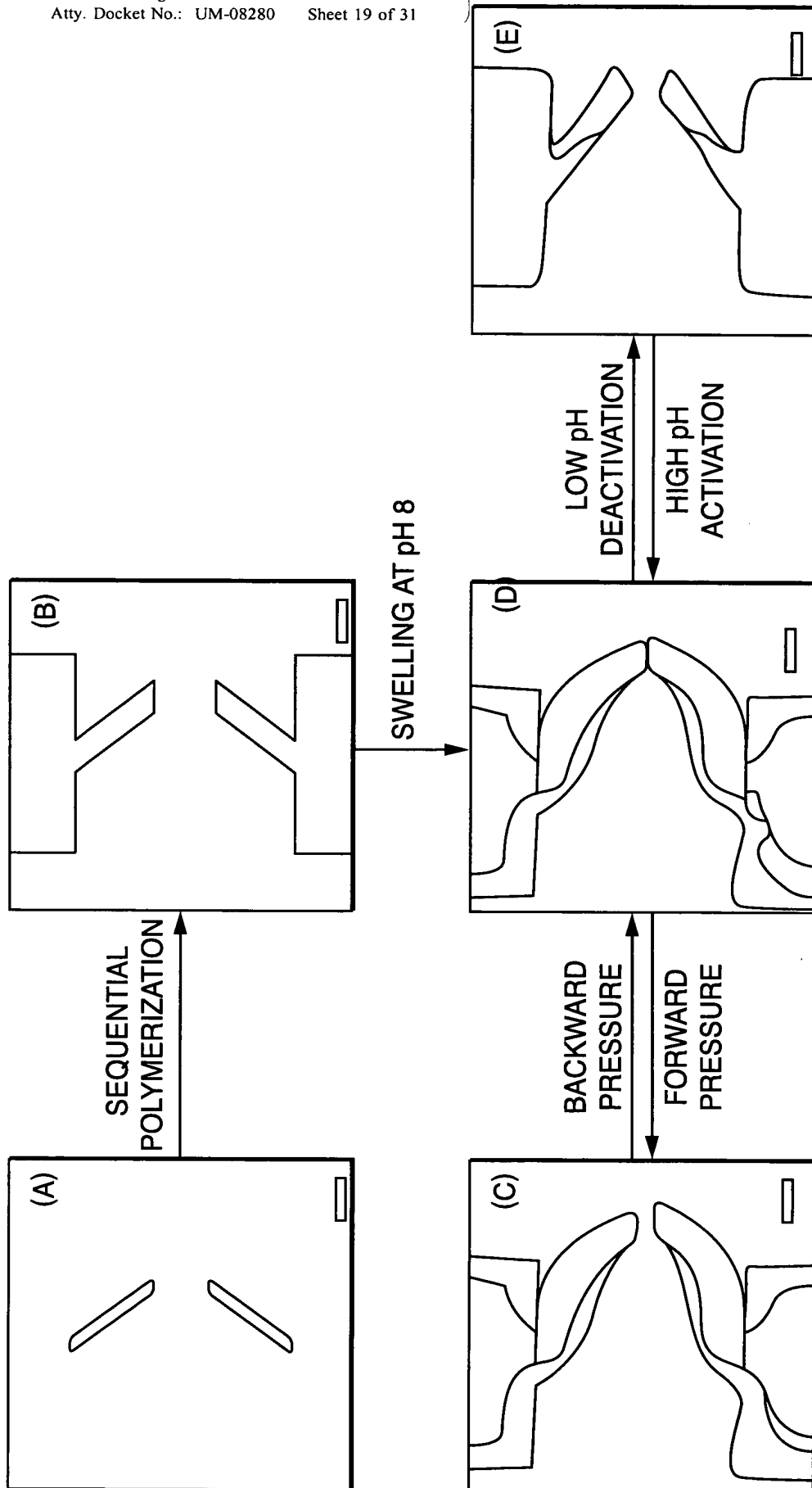


FIG. 17B

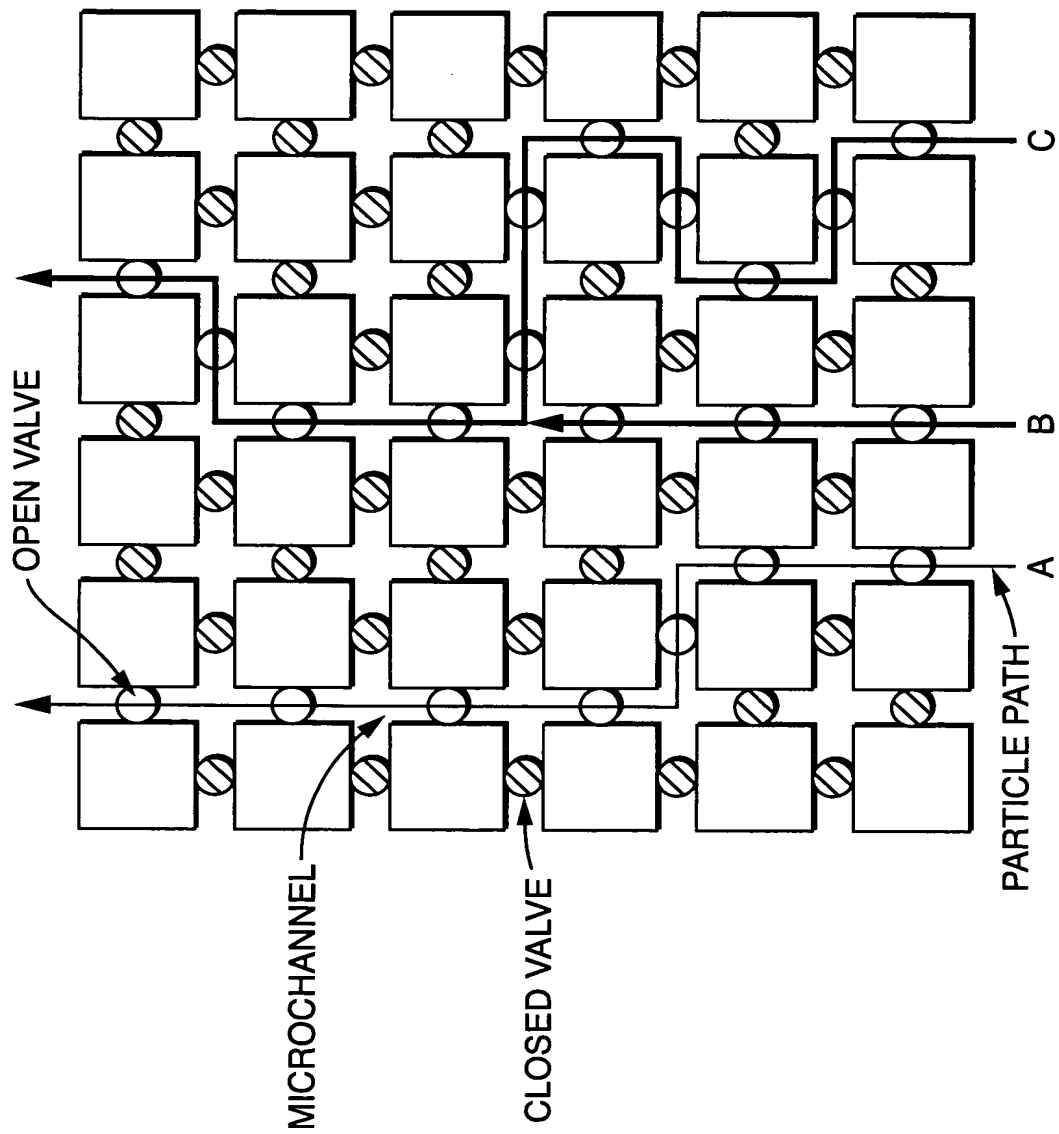


FIG. 18A

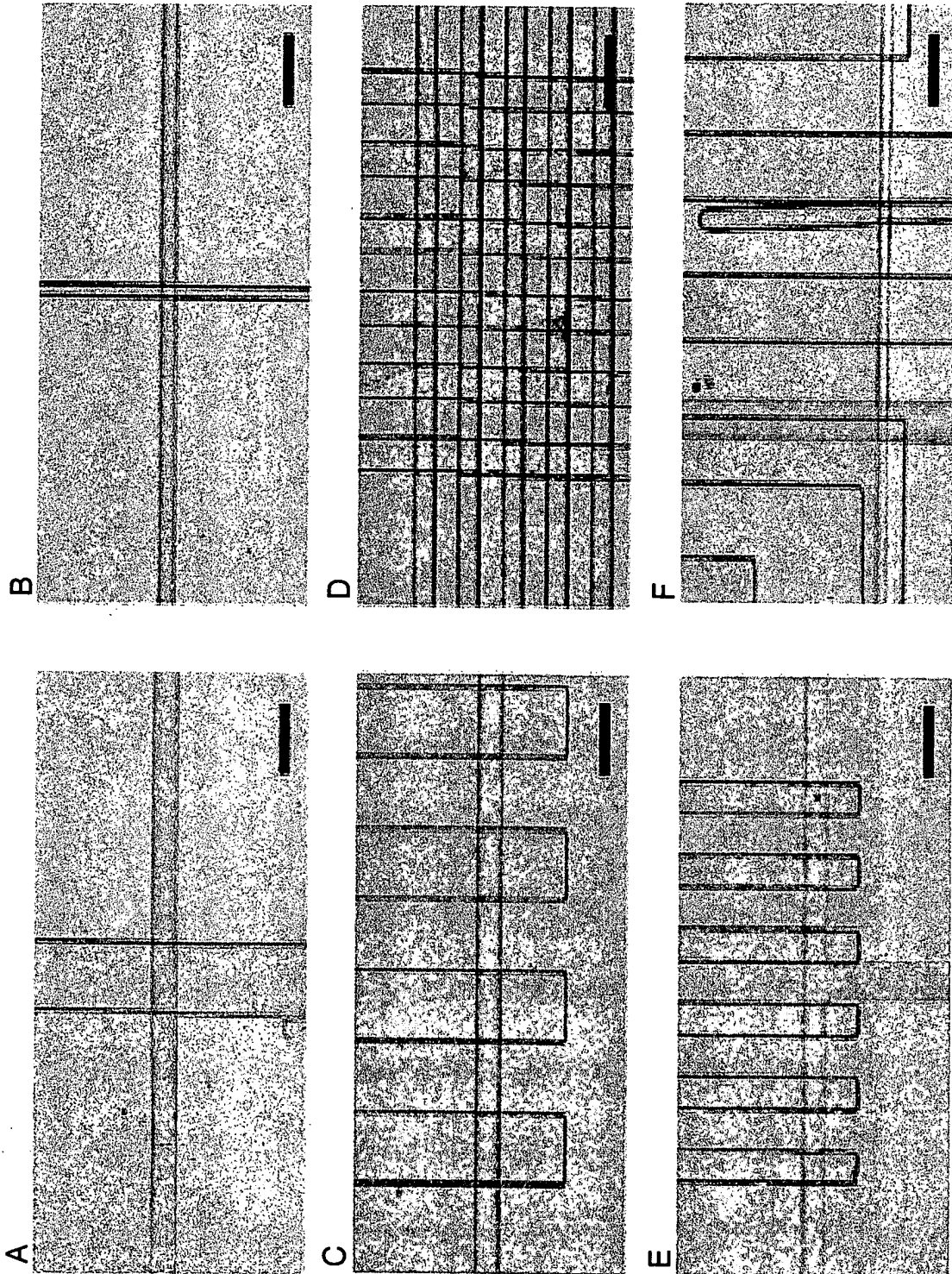


FIG. 18B



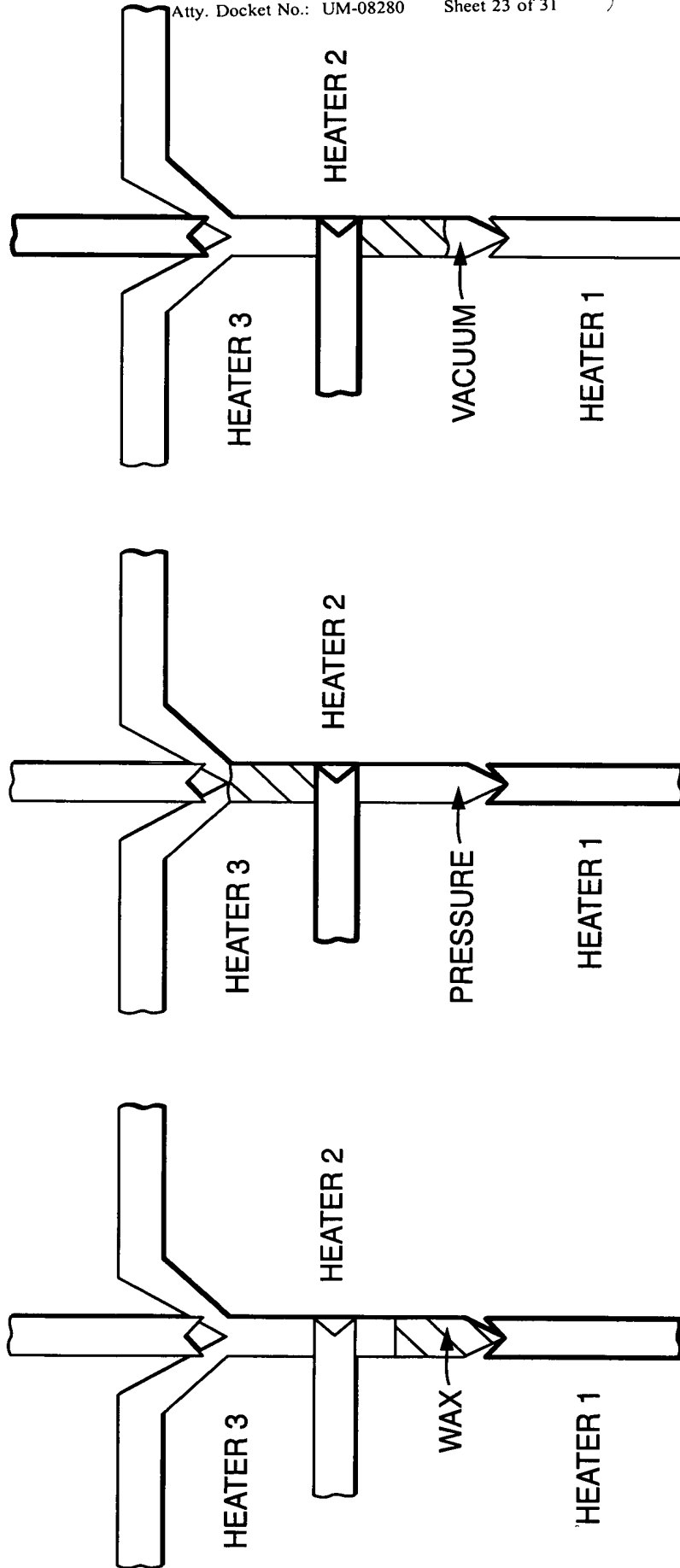


FIG. 20A

FIG. 20B

FIG. 20C



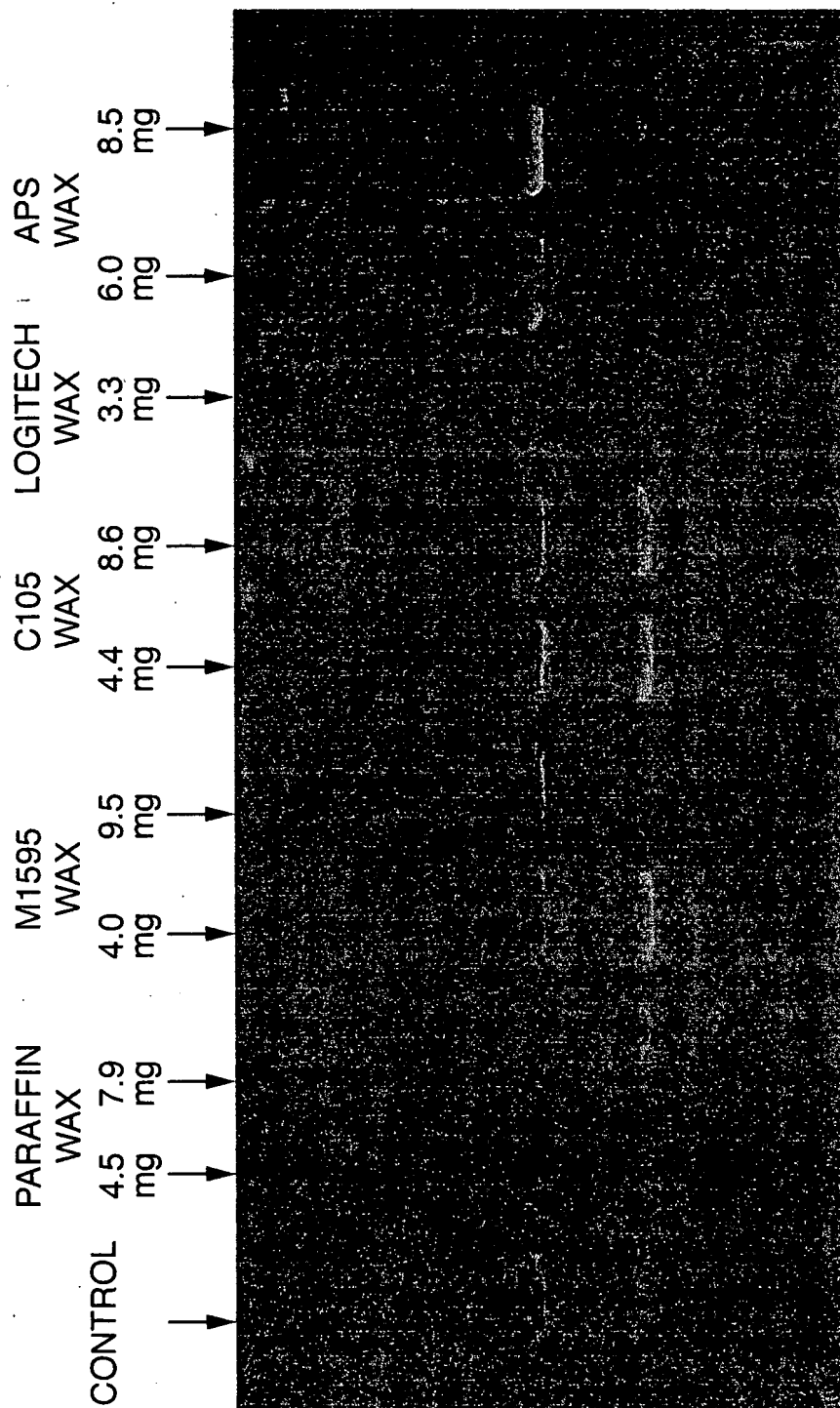


FIG. 21

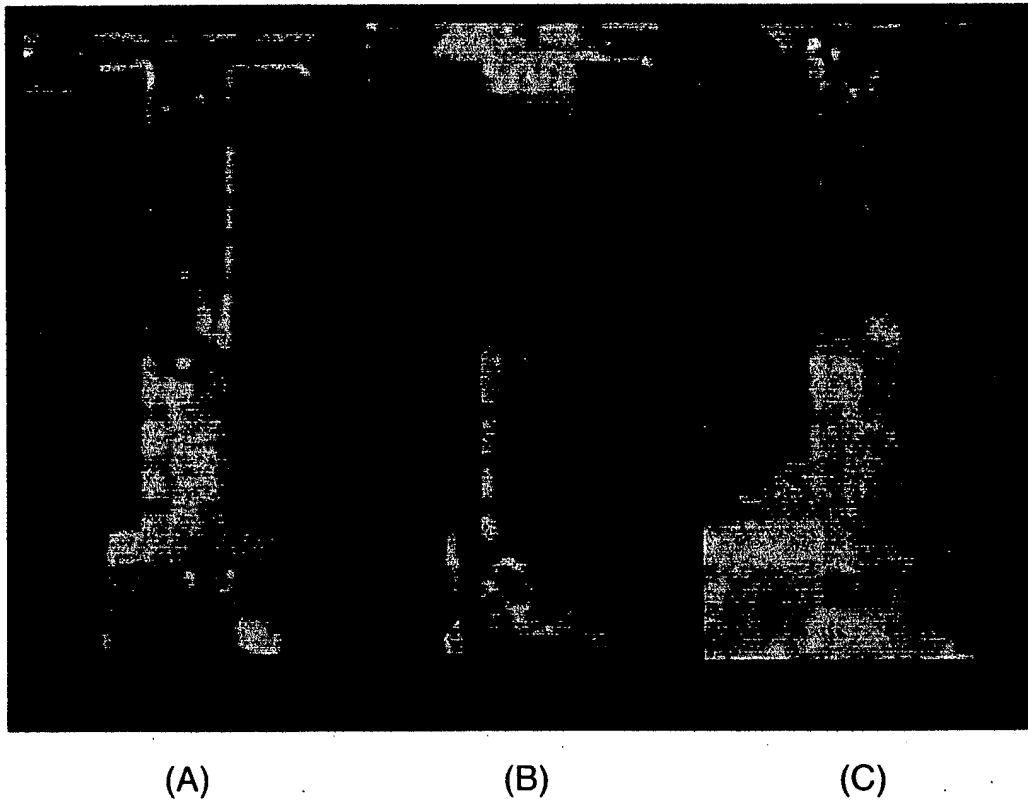


FIG. 22

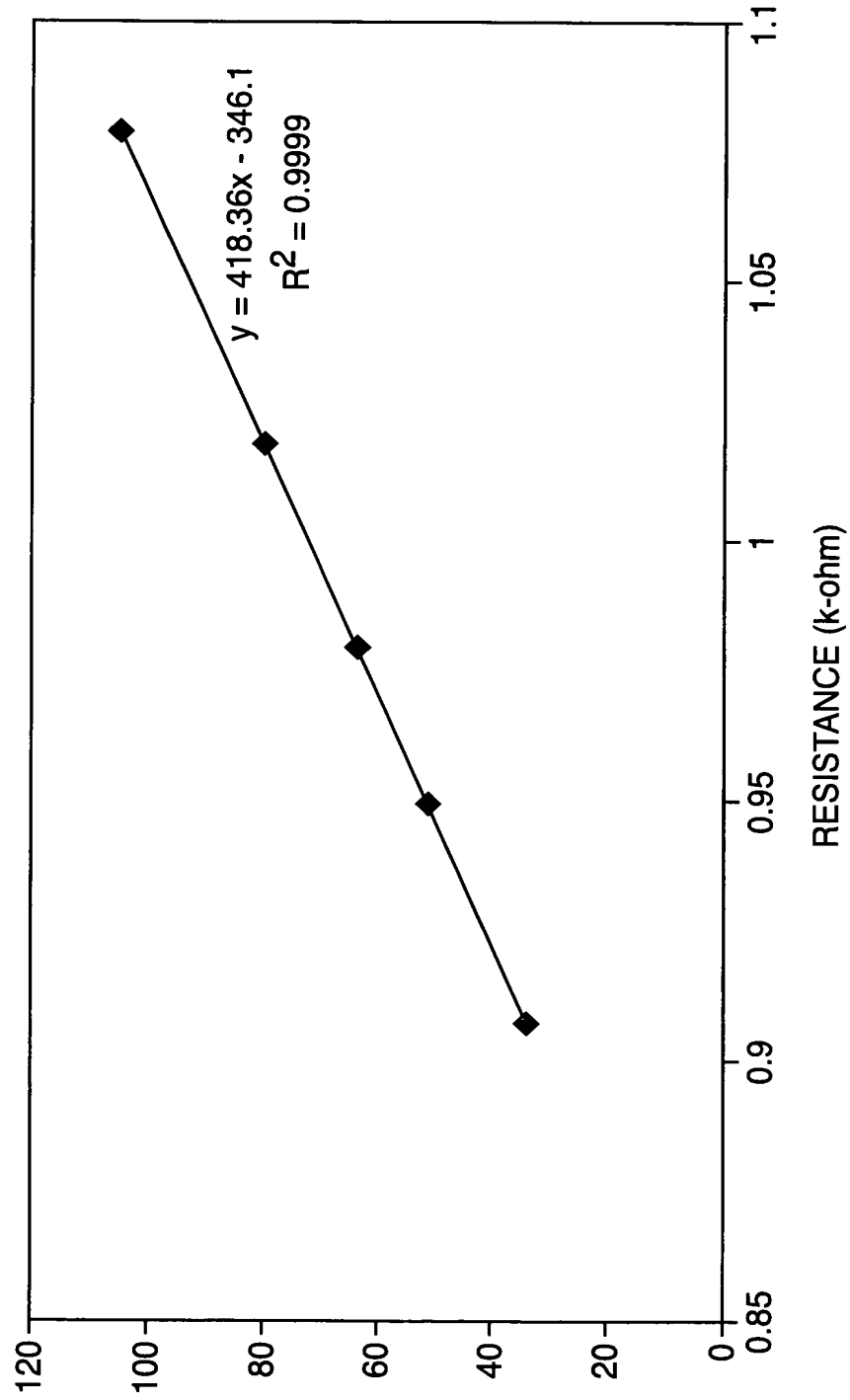


FIG. 23

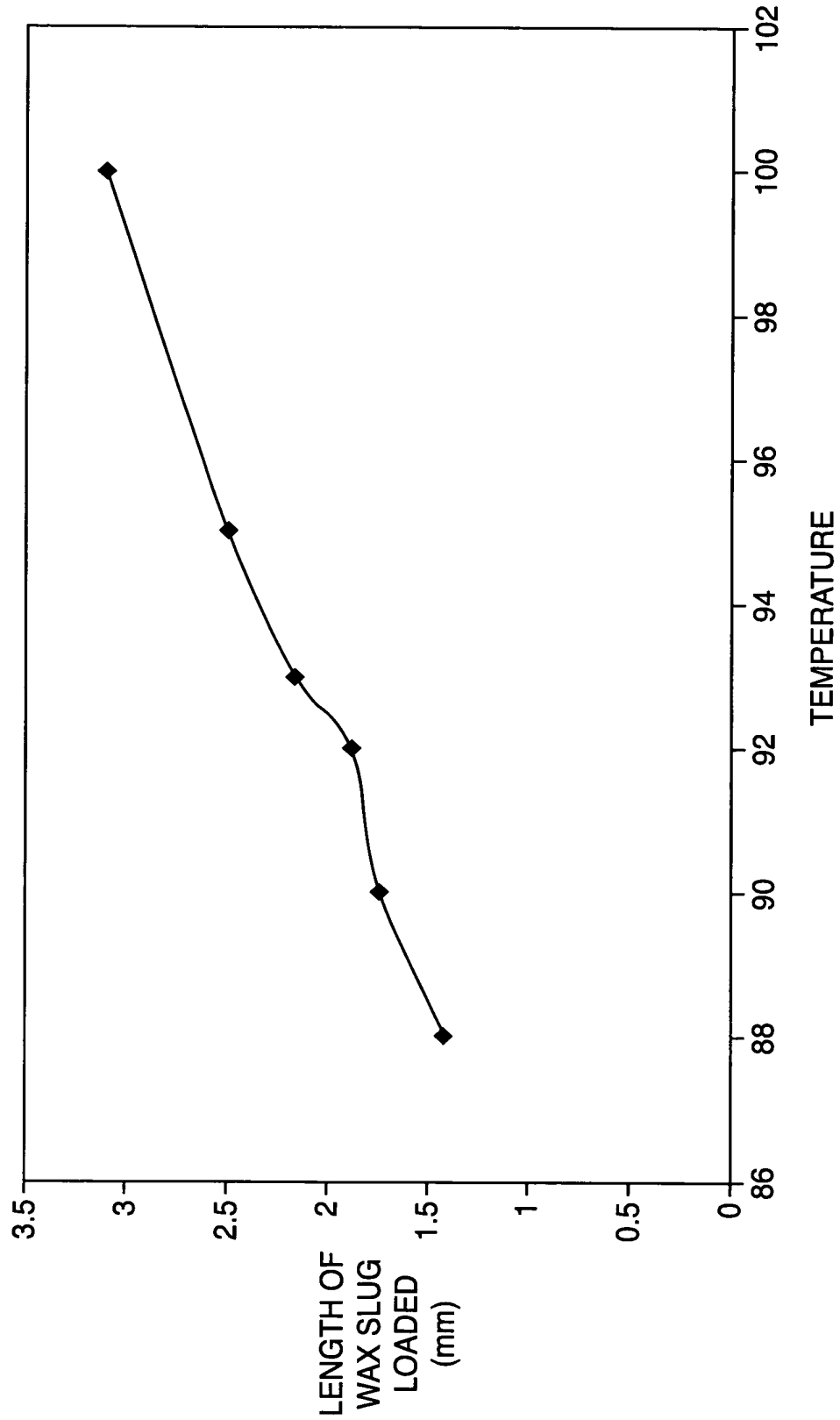


FIG. 24

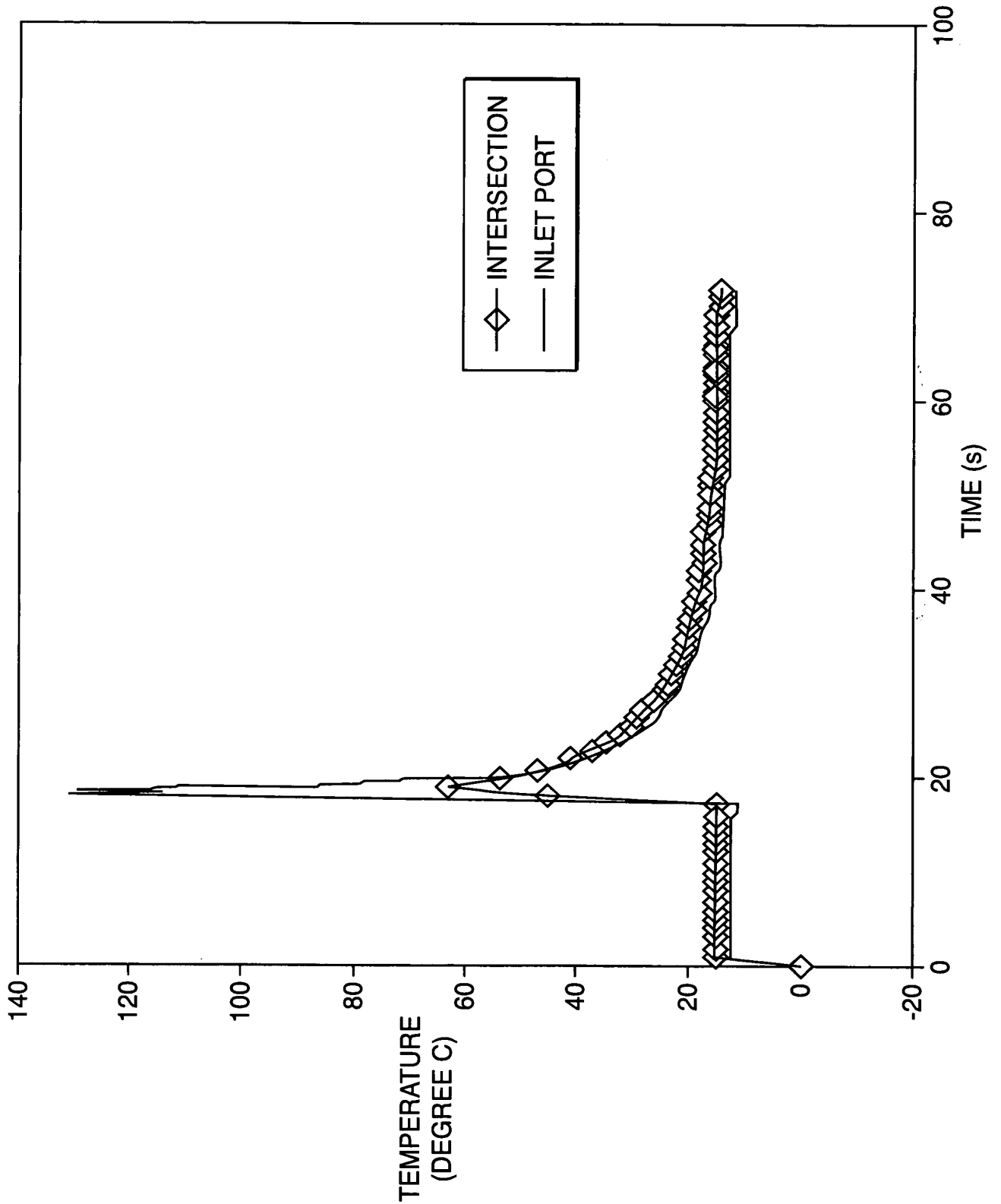


FIG. 25

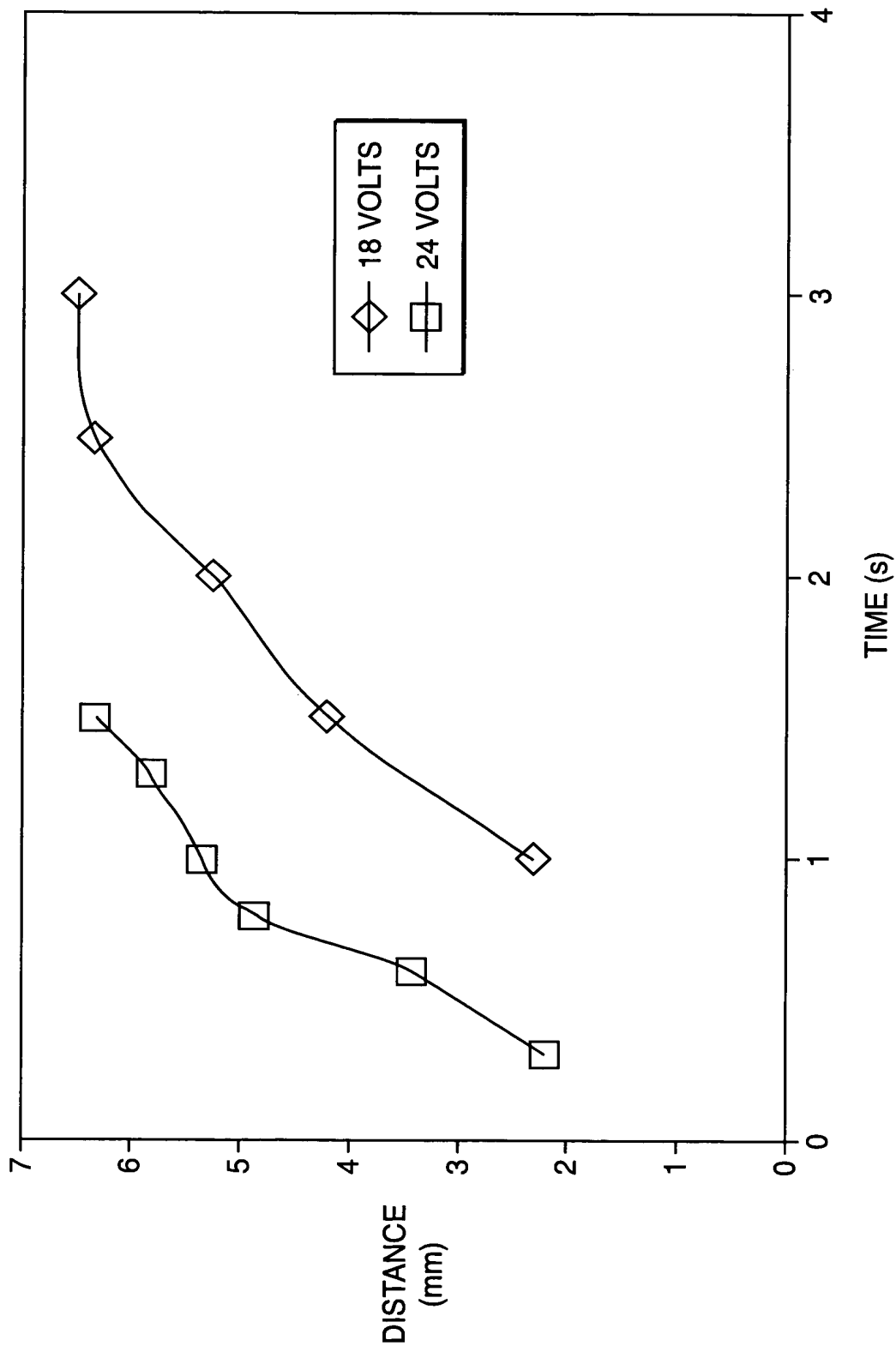


FIG. 26A

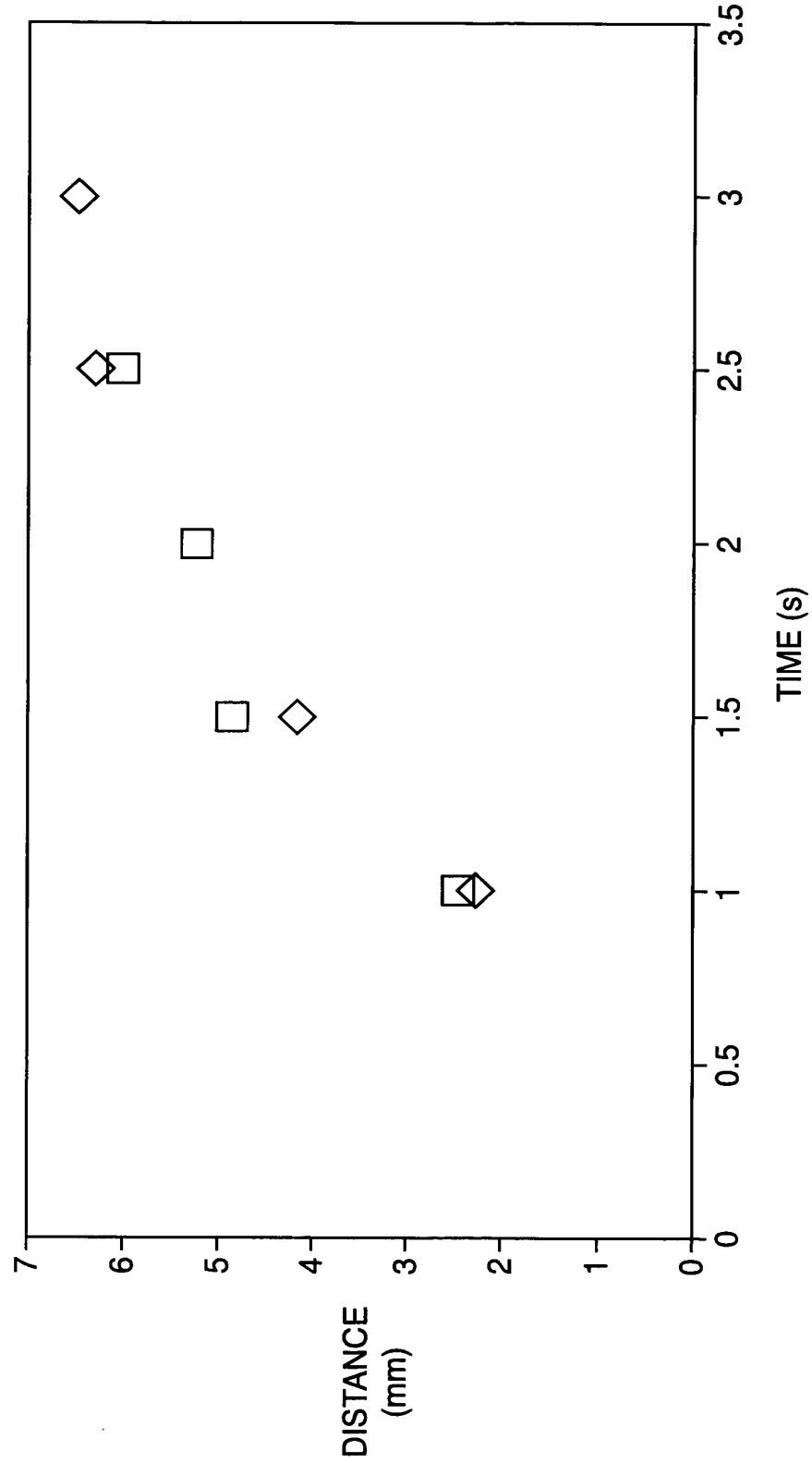


FIG. 26B

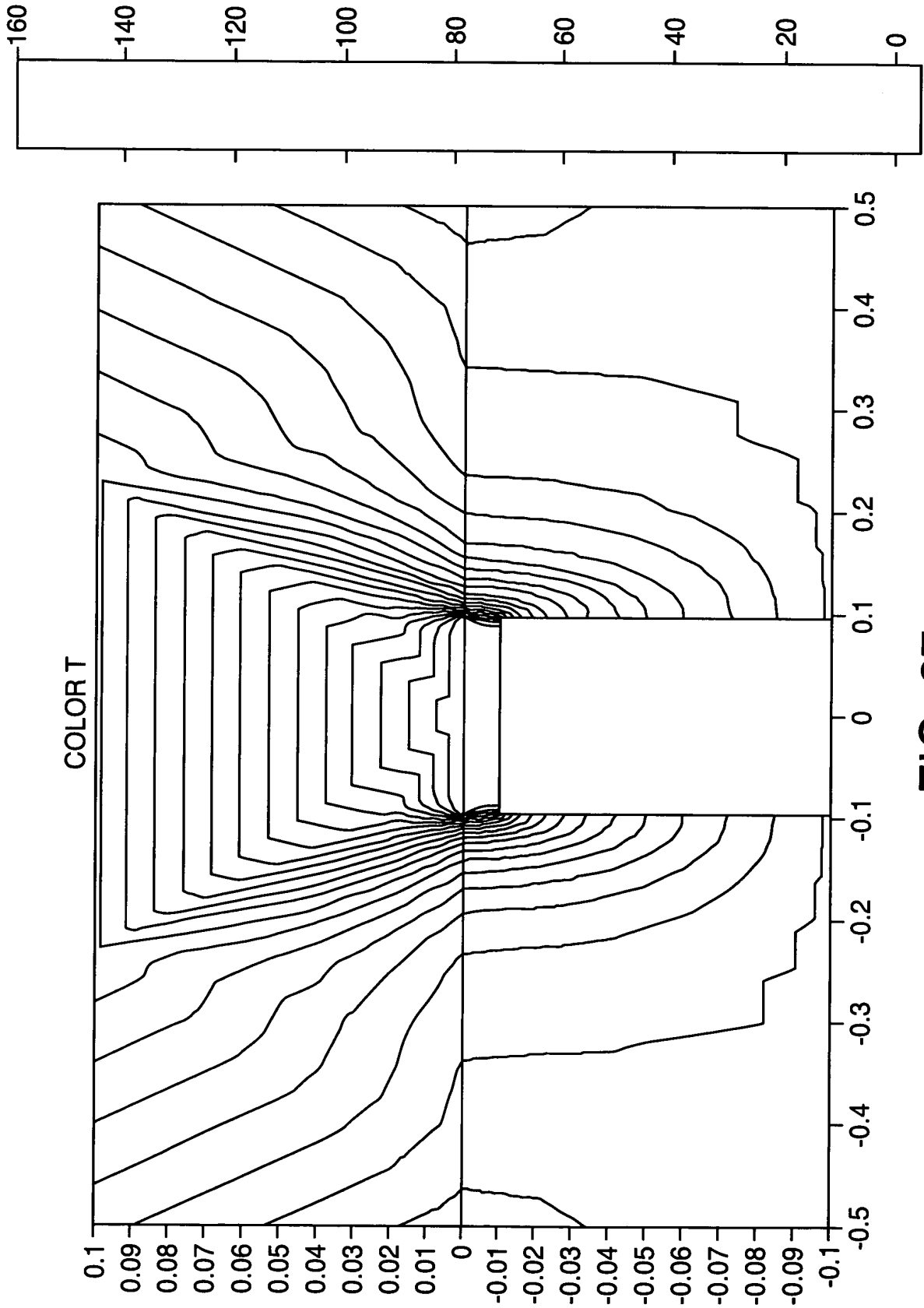


FIG. 27